

# Incidence of Building Collapse in Nigeria: Case of Lagos State

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**Abstract :** Occurrence of natural and human induced disasters the world over has overtime escalated in number and magnitude; it appears to have coincided with contemporary climate change events. The devastation in loss of lives and property as well as disruption in national socio-economic and quality of life indices has been enormous. This is more so in the less advanced countries of the world where capacity to manage disasters is quite limited. The need has arisen therefore for a thorough understanding of the situation in that latter group of countries to resolve this paradox. This is necessary for those countries to be placed in a position for a meaningful and more effective participation in global efforts in the management of urban environmental disasters.

Arising from the above, the cardinal aim of this paper is to analyze the trend and pattern as well as adducing factors responsible for building collapse in Nigeria using Lagos State as the study area. This is with a view to offering policy, planning and management implications of this phenomenon in the study area. The study has relied mainly on secondary data presented as Appendix I in a recently published book on *Disaster Risk Management in Nigerian Rural and Urban Settlements*. The appendix presented a total of 139 reported cases of building collapse in Lagos State over a period of 35 years. These were used for analysis and discussion. The analysis involved the use of table, chart and figures to indicate trends while spatial analysis showing distribution of the collapsed buildings was done using Global Positioning System (GPS) superimposing these as points on the thematic map of Lagos State.

Emanating from the study are the following: (1) an observed escalating rate of building collapse in Lagos State over time; (2) a concentration of reported cases in residential land use and in Lagos Island Local Government Area of the State; and (3) identified explanatory factors emanating from professionals in the building industry, developers and policy decision makers. By way of elaboration, the professionals in the building industry go about their duties independently and without an established forum for development process explanation. While the policy makers show lack of political will and influence a lot of development decisions, the system of development as well is fraught with corruption. The public also cannot be exonerated as most developers run foul of the laws governing zoning and development control and not supplying adequate building materials for construction all in a bid to minimize cost of construction. The contractors are also involved. In some situations where materials are adequately supplied, they choose not to use the right mix in order to maximize their returns. This implies that the problem of building collapse in developing countries with particular reference to Nigeria is a function of the negative contribution of the policy decision makers, the professionals and the public. The paper recommends increased political will for more effective policy formulation and implementation; removal of constraints and obstacles relating to coordination and synergy-building among professionals in the building industry; and encouragement of result-oriented public participation in urban environmental disaster management. The expected outcome of all these will increase knowledge towards sustainable urban neighbourhoods especially in developing countries.

**Keywords:** building collapse; coordination among agencies; disaster management; public participation; sustainable urban neighbourhoods

### Introduction

In addition to insecurity, public ill-health, bad governance and poverty among others, another major challenge inhibitory to the achievement of sustainable development that the global community is confronted with is disaster. The crises emanating from disasters, natural or human induced, in most developing countries where capacity to manage such is grossly inadequate is not only recurring [1] but also escalating. The resultant devastation in loss of lives and property as well as disruption in national socio-economic and quality of life indices has been enormous (Plate 1). One notable human induced disaster that has been frequent in occurrence in Nigeria is building collapse which has had a serious threat on the country's sustainable development. The geographical spread of this collapse has been found to be highly prevalent in Lagos and South West of the country [16] which could be attributed to high concentration of economic and social activities in these areas. [11] posit that increased vulnerability and people's exposure to danger especially as they live or work in precarious areas, constant insecure buildings and infrastructure or use unsound transport system could not be unrelated to the physical, political, socio-economic and demographic dynamics within the city's sphere.

Available statistics indicates that not less than 379 discovered deaths, several undiscovered deaths, multiple injuries and properties worth billions of naira have been lost to building collapse across Nigeria in the last 25 years [16]. What makes the situation more worrisome is the tendency for a rise in the scale and frequency of the collapse (including socio-economic losses) in the future, given the existing capacity of environmental disaster management, with the occurrence of incontrovertible climate change whose impacts have already spread across all spheres of development in the country. By further implication, the urban neighbourhoods in the country may become unsustainable and the cost of urban development may outrageously soar. This may impact negatively on the global efforts of achieving sustainable development and poverty reduction. The case of Lagos State is particularly peculiar due to its location (near coast) and exponential growth in population. As at 2006, the population of Lagos stood at over nine million [10] and by 2014, it has assumed the status of a mega city (a city with 10 million population or more [15]). The continued increase in population cannot be divorced from the major economic role the state is playing in the country. Being an important centre of commerce and major industries in Nigeria, it has continually attracted people from different parts of the country as well as internationally. This unabated population growth has influenced growth in building stock for residential, commercial, industrial and other land uses. And because of limited land area; development in some cases are spread over reclaimed areas (i.e., areas originally covered by water but later filled). The reflection that Lagos contributes to slightly more than 50% of all incidences of building collapse in Nigeria between 1974 and 2010 [16] is an indication that the quantitative growth of buildings there is not at par with the qualitative requirements. With the urban population of Nigeria projected to 212 million by 2050; Lagos with its rate of population growth is likely to accommodate a significant part of this projected urban population. This implies that demand for buildings will be inevitably higher and given the current rate of building collapse in the state, the tendency for more cases of collapse cannot be over emphasized.

Recommendations from earlier studies on the incidence of building collapse in Lagos have revolved around improved individual input from professionals in the building industry, carrying out soil test, building supervision, monitoring of the activities of professionals to discourage quackery among many others. However, other areas that need to be looked into include the collaboration of building professionals in ensuring quality delivery of sustainable building construction throughout the construction phases, and the participation of the public in the regulatory role of building construction. This study has analysed the trend and pattern of building collapse in Lagos, adduced factors responsible, reviewed recent efforts of government in controlling the incidence, analysed policy implication and proffered remedial measures.



**Plate 1: Rubbles of Collapsed Building in Lagos** Source: [5]

## Materials and Methods

### Study Area

Lagos State is one of the 36 administrative divisions of Nigeria exclusive of the Federal Territory. It is located in the southwestern part of the country. The smallest in area of Nigeria's states, Lagos state is arguably the most economically important state of the country containing Lagos, the nation's largest urban area. The actual population total is disputed between the official Nigerian census of 2006 (which puts Lagos State population at 9,013,534) and 17,500,000 figure claimed by the Lagos State Government. Average population density of the state is about 2,500/km<sup>2</sup>. Lagos State lies between latitude 6°35' and 6°583' degrees north of the equator and between 3°45' and 3°75' east of Greenwich meridian. On the North and East, it is bounded by Ogun State. In the West, it shares boundaries with the Republic of Benin. Behind its southern borders lies the Atlantic Ocean. 22% of its 3,577 km<sup>2</sup> are lagoons and creeks [5, 18].

Lagos as a port originated on islands separated by creeks. These include the Lagos Island fringing the southwest mouth of Lagos Lagoon while protected from the Atlantic Ocean by barrier island and long sand splits such as bar beach, which stretches up to 100 kilometers (62 miles) east and west of the mouth. From the beginning, Lagos has expanded on the mainland west of the lagoon and the conurbation including Ikeja (the capital of Lagos State) and Agege, now reaches more than 40 kilometers (25 miles) North West of Lagos Island. The suburbs include Ikorodu, Epe and Badagry. Constitutionally, the State has twenty local governments, sixteen of which constitute the Metropolitan Lagos, the remaining four LGAs (Badagry, Ikorodu, Ibeju-Lekki and Epe) constituting the suburbs. In 2003, many of the existing 20 LGAs were split for administrative purposes into Local Council Development Areas. These lower tier administrative units now number 56 [5]

### Method

The study was carried out using secondary data coupled with observation. 139 reported cases of building collapse in Lagos, Nigeria between 1978 and 2013 (Appendix I) in a recently published book on *Disaster Risk Management in Nigerian Rural and Urban Settlements* were used for analysis and discussion. Using a class interval of 5, the years of occurrence of building collapse were disaggregated into 6 (N.B: not all the years within some class intervals are consecutive), then number of reported cases were found within each interval and later used to find aggregate percentage for each class. In addition, the highest and lowest number of occurrences of building collapse within each class interval was deduced. The analysis was done with the use of chart, figures and table. Spatial analysis was also carried out using Global Positioning System (GPS) to obtain the locations of the collapses; these were superimposed on the thematic map of Lagos State obtained from the State's Ministry of Lands and Survey.

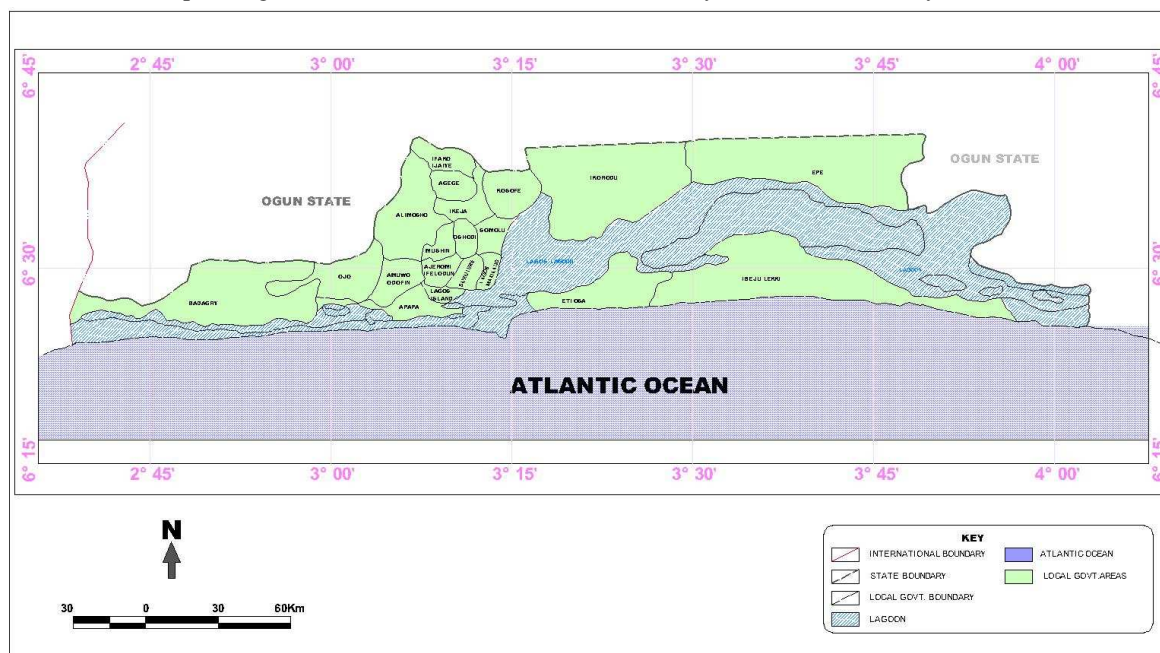


Fig. 1: Map of Lagos State Showing the Local Government Areas

Source: [9]

## Results and Discussion

### Reported Cases of Building Collapse between 1978 and 2013 in Lagos, Nigeria

The analysis of data on reported cases of building collapse in Lagos shows that between 1978 and 1986, 12.23% of the total number of building collapse occurred with an annual average of 2.45%. Between this period, 1985 recorded the highest frequency, about 7 cases representing over 41% of that time interval. The least occurrence between the period was recorded in 1978 and 1984 when only 1 reported case (0.72%) was observed in each year. The aggregate percentage of building collapse occurrence between 1987 and 1992 and between 1993 and 1998 was the same as well as annual percentage of reported cases. That is, between 1987 and 1992, 13.68% of the total collapse occurred; the same between 1993 and 1998. 1987 recorded the highest frequency of collapse between 1987 and 1992 with a frequency of 7 cases, about 5% of the total period and 37% for the class interval. Within the interval, 1991 has the least reported cases, 2, about 10%. 1995 appears to be the modal year in reported cases of collapse between 1993 and 1998 when 8 cases were recorded which amounts to 5.76% of the total and over 42% for the class interval. The least frequency of 1 case, about 0.72% occurred in 1993. The class interval that witnessed highest number of reported cases was between 1999 and 2003 followed by 2004 and 2008. From 1999 to 2003, there were 36 reported cases representing about 26% of the total occurrence. This implies that annually between this period, not less than 7 reported cases were observed. 2000 and 2002 had highest frequency between the period, 9 cases, each constituting 25% in the group and over 6% of the total. To further consolidate that highest number of occurrence was between this period, the least for the class (greatest among the least in other intervals) was 5 cases of collapse, about 4% of the total, occurring in 1999 and 2001. The frequency of occurrence between 2004 and 2008 is also of particular interest as noted earlier. Between these periods, about 22% of the total collapse occurred with 2006 being the most significant of all the occurrences. 2006 only accounts for a slight proportion over 10% of the entire period (14 reported cases) and close to 65% for the group. The analysis also indicates that an average of 6 cases of collapse was reported annually between the class interval. Though there was a drop in the cases between 2009 and 2013 as compared with other years, nevertheless, the analysis indicates that close to 4 reported cases, about 20% within the class interval, was recorded annually. The end seems not to have come to the occurrence of building collapse in the state as another massive structure (religious building) collapsed in 2014 claiming more than 100 lives. Some of the factors responsible for the collapse are discussed in the next subsection.

Class Interval	No of Cases within Interval	Annual Average (%)	Aggregate Percentage	Highest	Lowest
1978-1986	17	2.45	12.23	7	1
1987-1992	19	3.8	13.67	7	2
1993-1998	19	3.8	13.67	8	1
1999-2003	36	7.2	25.89	9	5
2004-2008	30	6	21.59	14	1
2009-2013	18	3.6	12.95	5	2
	<b>139</b>		<b>100</b>		

**Table 1: Trends of Building Collapse Cases in Lagos (1978 and 2013)**

Source: Authors, 2014. Derived from [11].

### Explanatory Factors

Of all the reported cases, the study shows that over 94% of the total building collapse for the entire study period was caused by structural deficiencies. Included in this factor were weak foundation, dilapidation, failure of building members (such as slabs, walls etc), lack of maintenance, construction defects (inadequate reinforcement, weak/substandard building materials) among many others. While the unknown cause of the collapses takes an insignificant proportion of less than 1%, causes by natural and human factors amount to slightly over 5%. These disasters range from flood, land subsidence to fire and plane crashes occurring in 2001, 2006, 2011 and 2012 respectively. Several other studies have also adduced the causal factors of building collapse in Lagos specifically and Nigeria in general to human induced and natural factors. For instance, structural deficiencies have been attributed to a number of factors like faulty design (which could be as a result of wrong assumption), inadequate or unequal support for foundation, soil and ground water movements [6]. Other factors include product failure,

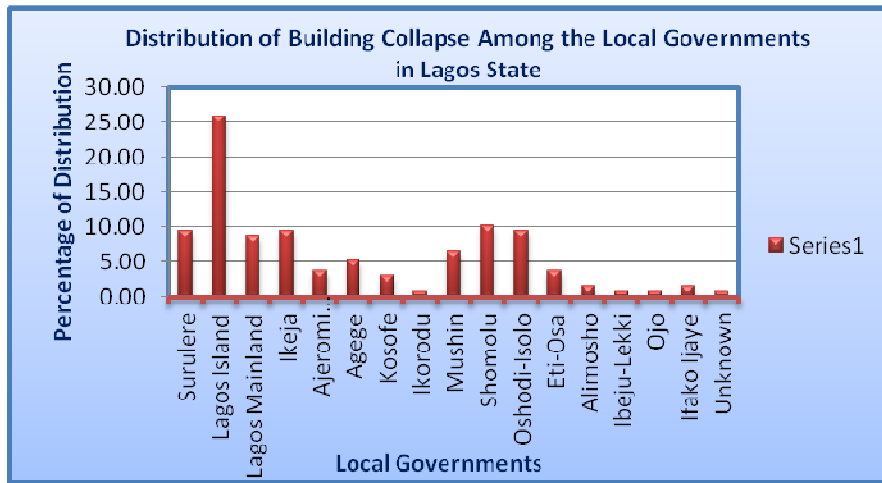
constituting about 40% of occurrences in Nigeria [13]; use of faulty materials and poorly executed work on construction site [12]; lack of construction supervision and non-compliance to building codes and regulation with a significant number of developers not obtaining necessary development permits; use of inexperienced/unskilled labour and quacks. The analysis on poor building materials as a major factor of building failure/collapse in Nigeria has been taken to account for 50% of all incidents of building collapse in Nigeria, Lagos inclusive [14]. In addition to the factors highlighted above, this study has also observed the following: (1) most building contractors are instrumental to the menace through reduction of supplied materials for construction in order to maximise their gains; (2) developers (clients) avoid clearance of development, that is, they do not obtain necessary development permit and in most cases where their buildings are marked for contravention, they defy the order with the continuation and completion of the building project. (3) The government and their officials are also not left out; on the part of the policy makers, they influence a lot of decisions on development by prompting the officer in charge of approval to grant permission to undeserving projects for political reasons while on the part of the approving personnel (Town Planning Officials), some of them take bribe from developers after they have been lobbied to accept unacceptable proposals. (4) There is absolutely lack of coordination among the professionals in the building industry, rather than handling over to each other at the appropriate phase of the project and giving situation report, some professionals prefer to extend their scope of service to areas where they do not have professional competence taking advantage of the ignorant client. In a related manner, at the level of approval and site supervision before the commencement of the project; professionals do not carry themselves along owing to unnecessary suspicion of each other. (5) Environmental factors: geographic location, natural disaster like land subsidence are also possible factors.

Essentially, the factors responsible for building collapse in Lagos specifically and Nigeria in general can be summarized into five: lawlessness, corruption, unprofessionalism, lack of coordination among stakeholders and environmental factors

#### **Spatial Spread and Pattern of Collapse within the Local Government Areas in Lagos**

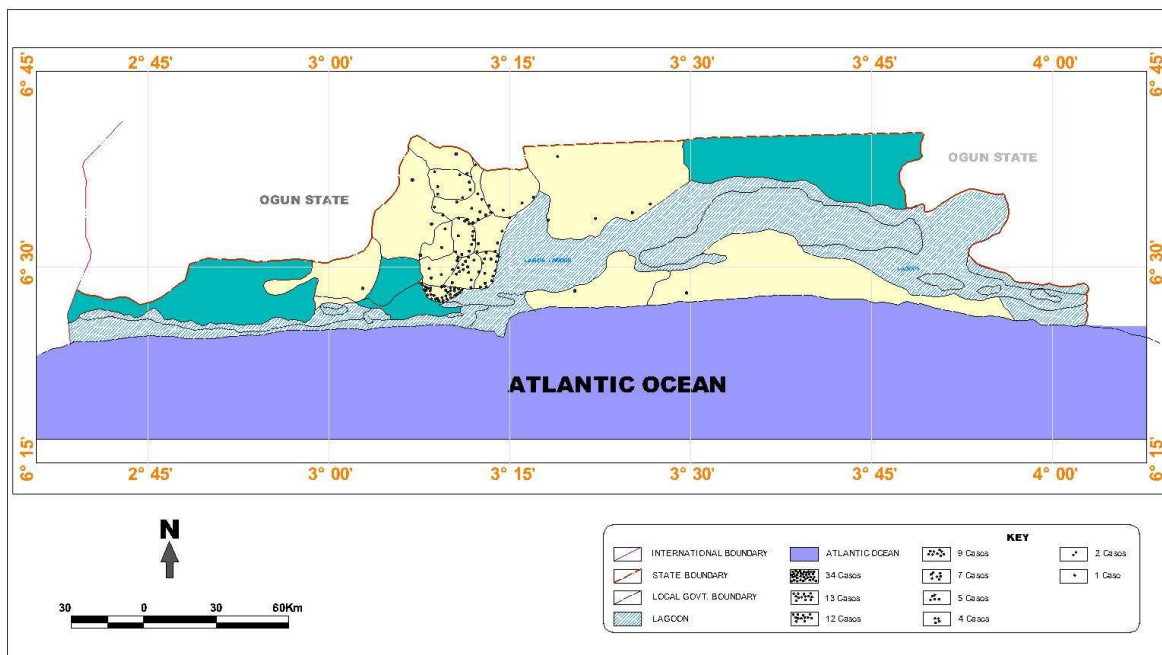
As indicated in the analysis (Fig. 2), the local government area in Lagos where building collapse occurred most in the period under review was Lagos Island with about sixty percent of the cases occurring there. Other local government areas with significant record include Shomolu, Surulere, Oshodi-Isolo, Lagos Mainland and Mushin constituting about 10%, 9%, 9%, 9% and 7% respectively of the total collapse. This implies that these local government areas are where majority of building construction, mainly residential (75% of the building use involved) in Lagos takes place. And the fact that the type of buildings involved was predominantly residential also points to the fact that there is high demand for housing in the State, especially as the population continues to burgeon. Though whether those building were public or private is not within the consideration of this paper, but it may be inferred that housing suppliers in the state have not been properly regulated in terms of the delivery of the products. Following residential are commercial buildings in collapse ranking as about 12% of the total reported collapses in the study area were commercial. Obviously as population increases, the quest for economic activities will equally rise. Other types of building use involved were institutional, 5.04%; religious, 4.32%; mixed use, 2.16% and unknown building use type constituting 1.43%. Apart from the places mentioned, building collapse also occurred in ten (10) other local government areas, bringing the total of LGAs where cases were reported to sixteen; which means that within the study period, incidents of building collapse had occurred in 80% of the entire Lagos State (consisting of 20 LGAs). Though, several studies have adduced the causes of these collapses to sub-standard building materials, unprofessionalism, lawlessness, corruption to name but a few; this paper finds it proper for robust consideration of environmental factor, especially, geographic location in this regard. 80% of the places where collapses were recorded were close to Lagos Lagoon and creeks (see Fig. 3)

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**Fig.2: Analysis of distribution of building collapse in Lagos State’s Local Government Areas, between 1978 and 2013.**

Source: Authors, 2014. Derived from [11].



**Fig.3: Spatial Distribution of Cases of Building Collapse in Lagos State**

Source: Authors, 2014.

**Efforts of the Lagos Government on Averting Building Collapse**

Having analyzed the trend in the incidents of building collapse and the pattern of spread in Lagos, the paper considers it appropriate to also look at some of the past efforts the government of the state, being the major regulator, has put in bringing the occurrence to the barest minimum. In this regard, three important efforts of the state are noteworthy. The first was the enactment of the Lagos Urban and Regional Planning Law of 2010, the establishment of the Lagos State Building and Control Agency in the same year and the setting up of Tribunal of Enquiry on Building collapse in May, 2013. The Law vested in the hand of Ministry of Physical Planning and Urban Development the power to control development in the state. In furtherance of the activity of the Ministry, LSBCA was set up with the responsibilities of ensuring that intending developers pass through due process before commencing work on site as well as ensuring that contractors use specified building materials. The Agency since its creation has embarked on compilation of distressed buildings, pulling some down and marking some for demolition

but in most cases, the owners seek court injunction to avert the demolition. The Tribunal has also just concluded its report on incidence of building collapse between 2007 and 2013 [19].

### **Implication for Planning, Management and Sustainable Development.**

Given the exponential growth of Lagos and its present status as a megacity coupled with the projected increase in urban population for Nigeria by 2050 (212 million) [15] which a chunk or big part is also expected to add to the existing population of Lagos, being the commercial nerve of the country and an important attraction centre, there is a great tendency that the demand for housing and other building uses will continue to escalate. An important factor here is the total land area of Lagos, that is, the question of its capacity to accommodate the increase in population in the future. Lagos itself is a coastal city and as emphasized earlier, 22% of the 3,577 km<sup>2</sup> total land area of the state is lagoon and creeks. What this implies are: (1) there is tendency for more encroachment on the coastal part of the city; (2) a serious process of gentrification may continue to set in; a lot of more conversions are imminent, the capacity of existing structures are likely to increase which may come without improvement to existing structural stability. With the existing limited building construction regulatory capacity in the state, more human induced disaster such as building collapse may be on the increase; this connoting that the cost of urban development may soar while the existing neighbourhoods with the likely modification they go through overtime may be rendered unsustainable in terms of meeting socio-economic needs of the people.

Lastly, with the current incontrovertible climate change, more challenges are looming on building collapse in Lagos and other coastal cities in Nigeria. Already, Lagos being a coastal city has been experiencing excessive floods which are likely to continue with the continuing sea level rise. In most cases, the poor are at the receiving end of the catastrophes, losing their homes, properties and even lives. The choice of the poor living in hazard prone areas, where the cost of land is affordable to them, increases their vulnerability to environmental disaster including building collapse. On the aggregate, the level of poverty of urban poor people becomes heightened with climate change adding to the woes of building collapse, thus jettisoning the sustainable development efforts.

### **Conclusion**

The study, from the preceding sections, has shown that incidents of building collapse in Lagos has been recurring and also escalating. The annual average rate of building collapse was around 2.45% during the early years of the study period, this rose to about 4% in the mid-period and in few years after increased to 7% before declining to about 4% again towards the latter years of the period of observation. However, it was during the latter part of the study period that highest cases were recorded, even in 2014, a religious building has collapsed killing more than 100 foreigners and undisclosed number of the citizens of the country. Lagos Island appears to be the most affected local government area in the state and with respect to building use; residential buildings were the most affected. The devastation in loss of lives, property and investment is unquantifiable; this by further implication will have negative influence on the growth of GDP in the State specifically and the nation's economy in general. Though, explanatory factors can be categorized into natural and man-made, the part played by the latter is overwhelming and essentially revolved around the policy makers who have not been giving enough political will, the private (embodying the professionals and contractors) who lack coordination and the public (the people). One factor that is embedded among the 3ps is lawlessness.

Against this backdrop, the paper is suggesting an increased political will on the part of policy makers, removal of constraints and obstacles relating to coordination and synergy building among the professionals in the building industry and encouragement of result-oriented public participation to overcome the problem of building collapse not only in Lagos but Nigeria as a whole. The contribution of all the identified stakeholders is an interwoven one. For instance, for members of the public to recognize the approved/registered professionals to consult will require the professional associations making available to the public the list of all registered professionals through using appropriate technology or channel on a regular basis. The government also needs to educate members of the public on the need to report cases of illegal construction and development with overriding public interest.

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